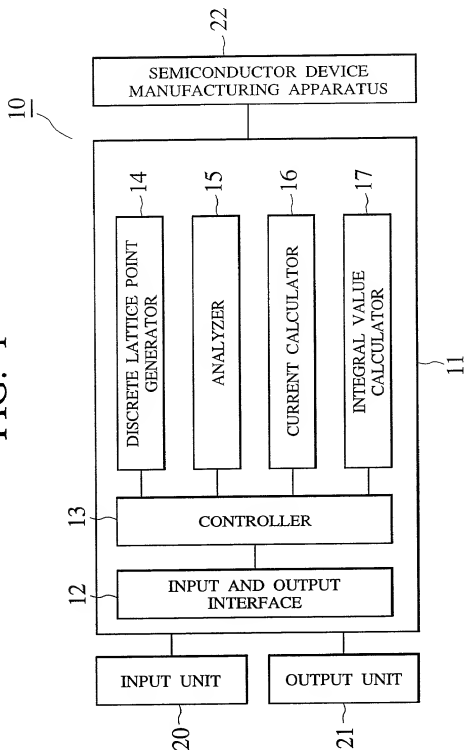


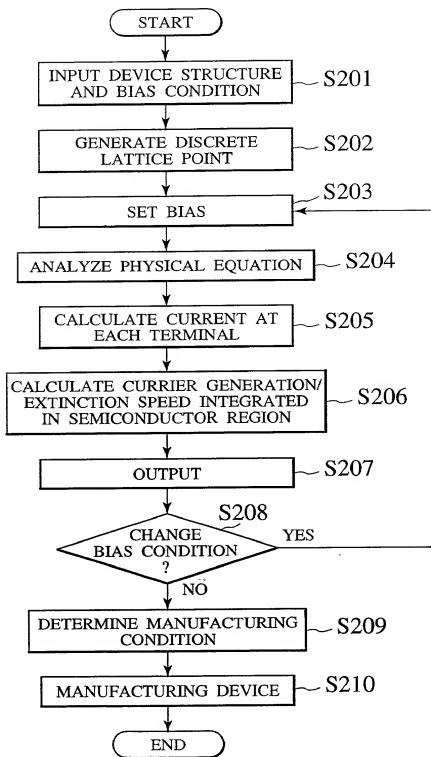
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FIG. 1



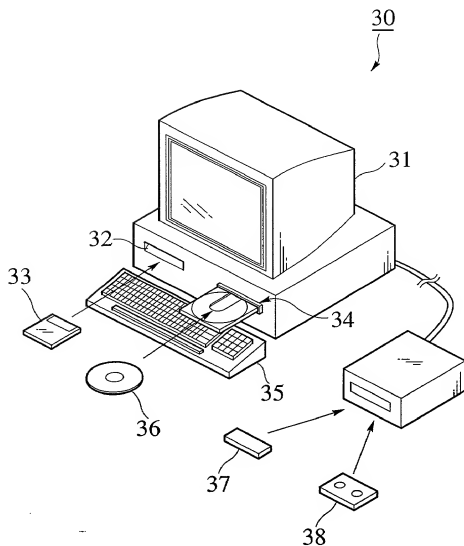
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FIG. 2



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FIG. 3



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FIG. 4

(DEVICE STRUCTURE)

IMPURITY CONCENTRATION
OF P-TYPE SUBSTRATE $3 \times 10^{17} \text{cm}^{-3}$

GATE OXIDE FILM THICKNESS 6nm

GATE ELECTRODE N-TYPE POLYSILICON

GATE LENGTH $0.3 \mu\text{m}$

SOURCE/DRAIN DIFFUSION LAYER
MAXIMUM CONCENTRATION $1 \times 10^{20} \text{cm}^{-3}$

SOURCE/DRAIN DIFFUSION LAYER
JUNCTION DEPTH $0.08 \mu\text{m}$

DEVICE WIDTH $1 \mu\text{m}$

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FIG. 5A

	NO GR	SRH ONLY	II ONLY	BBT ONLY	ALL
SOURCE CURRENT	4.08E-17	1.38E-17	1.37E-17	4.17E-19	1.29E-18
DRAIN CURRENT	4.07E-17	6.78E-17	6.72E-17	9.45E-14	9.63E-14
SUBSTRATE CURRENT	3.37E-18	9.41E-18	1.72E-18	9.45E-14	9.62E-14

FIG. 5B

SOURCE CURRENT	1.29E-18
DRAIN CURRENT	9.63E-14
SUBSTRATE CURRENT	9.62E-14

MECHANISM	VOLUME INTEGRAL VALUE X PRIME CHARGE
J _{SRHn}	1.50E-17
J _{II n}	1.68E-15
J _{BBTn}	9.45E-14

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FIG. 6A

	NO GR	SRH ONLY	II ONLY	BBT ONLY	ALL
SOURCE CURRENT	4.08E-04	4.48E-04	4.48E-04	4.48E-04	4.48E-04
DRAIN CURRENT	4.08E-04	4.48E-04	4.48E-04	4.48E-04	4.48E-04
SUBSTRATE CURRENT	4.66E-18	1.59E-17	4.33E-08	4.66E-18	4.33E-08

FIG. 6B

SOURCE CURRENT	4.48E-04
DRAIN CURRENT	4.48E-04
SUBSTRATE CURRENT	4.33E-08

MECHANISM	VOLUME INTEGRAL VALUE X PRIME CHARGE
J_{SRHn}	4.78E-14
J_{IIn}	4.33E-08
J_{BBTn}	0.00E+00

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FIG. 7A
$$\frac{\delta n}{\delta t} = \frac{1}{q} \vec{\nabla} \cdot \vec{J}_n + GR_n$$

FIG. 7B
$$GR_n = GR_{SRHn} + GR_{IIn} + GR_{BBTn}$$

FIG. 7C
$$A_{SRHn} = \int_{Si} GR_{SRHn} dv$$

FIG. 7D
$$A_{IIn} = \int_{Si} GR_{IIn} dv$$

FIG. 7E
$$A_{BBTn} = \int_{Si} GR_{BBTn} dv$$

FIG. 7F
$$J_{SRHn} = q \int_{Si} GR_{SRHn} dv$$

FIG. 7G
$$J_{IIn} = q \int_{Si} GR_{IIn} dv$$

FIG. 7H
$$J_{BBTn} = q \int_{Si} GR_{BBTn} dv$$